

## Maximum rainfall in one hour or less—Continued.

Station.	Maximum fall in—					
	5 min.	Date.	10 min.	Date.	1 hour.	Date.
Eastport, Me.	Inch.		Inch.		Inch.	
Galveston, Tex.	0.25	24	0.30	24	0.40	24
Jupiter, Fla.	0.35	29	0.50	29	1.20	29
Kansas City, Mo.	0.40	19	0.55	19	0.65	14, 19
Key West, Fla.	0.35	16	0.50	16	0.80	16
Marquette, Mich.	0.24	22	0.29	21	0.46	22
Memphis, Tenn.	0.20	15, 24	0.30	24, 25	0.50	24, 25
New York City.	0.25	16, 29	0.40	16	0.70	16, 29
New Orleans, La.*	0.12	16	0.18	16	0.25	16
Norfolk, Va.	0.16	18	0.18	18	0.22	18
Philadelphia, Pa.	0.20	17	0.31	17	0.53	17
Philadelphia Water Works	0.11	21	0.22	21	0.55	17
Portland, Oregon.	0.17	22	0.27	22	0.37	22
Saint Louis, Mo.	0.25	16	0.46	20	1.03	8
Saint Paul, Minn.*						
San Diego, Cal.						
San Francisco, Cal.*						
Savannah, Ga.	0.23	8	0.32	8	0.48	8
Washington City.	0.30	21	0.52	21	0.95	21
Wilmington, N. C.	0.30	8	0.56	8	1.17	8

\* Register not working.

† Not sufficient to register.

## HAIL.

Description of the more severe hail storms of the month is given under "Local storms." Hail was reported as follows: 1st, Ill., Iowa, Kans., Ky., Mo., Nebr., N. H., Tex., Utah, Wis. 2d, Ala., Iowa, Kans., Mo., Nev., N. H., N. Y., Pa., S. Dak.,

Utah, Wis., Wyo., Okla. T. 3d, Ill., Ind., Iowa, Ky., Mo., N. C., Ohio, Okla. T., Tenn., Va., W. Va., Wis., Wyo., S. C. 4th, Mo., N. Mex., Wyo. 5th, Mo., N. Mex., N. C., Tenn., Va., S. C. 6th, Ark., Ga., Ill., Mo., Ohio, S. C., Tenn., Tex., Wash., Wis. 7th, La., Miss., Mont., Pa., S. C., S. Dak. Tenn. 8th, Ala., Miss., Pa., Tenn. 9th, Fla., La., Miss., Mo., N. Dak., S. Dak., Wyo. 10th, Iowa, Miss., Ohio. 11th, Ark., La., N. Mex. 12th, Fla., Nev., N. Mex., N. Dak., Tenn., Utah. 13th, Ark., Kans., Nev., Cal., N. Dak., Utah. 14th, Kans., Nebr., N. Dak., S. Dak., Tex., Wis., Wyo. 15th, Ill., Kans., Nebr., N. Mex., Tenn., Tex., Wyo. 16th, Iowa, Kans., Pa., Tex., Vt. 17th, Pa., Wyo. 18th, La., Ohio, Oregon, Wash., Wyo. 19th, Ark., Kans., Wyo., 20th, Ark., Ill. 21st, Cal., Oregon, Pa., S. Dak. 22d, Mont., N. Mex., Oregon. 23d, Iowa, N. Dak. 24th, Iowa, Minn., Nebr., Wis. 25th, Colo., La., Nebr., Wyo. 26th, Ariz., Mont., Nebr., N. H., N. Y., Pa., Vt., Wyo. 27th, Iowa, Kans., Minn., Mont., N. Mex. 28th, Colo., Ill., Iowa, Kans., Minn., Miss., Mo., S. Dak. 29th, Iowa, Kans., Ky., Miss., N. Mex., Ohio, Tenn. 30th, N. Mex., Pa., S. C., Tenn. Sleet was reported on the 1st at Levan, Utah.

## SNOW (in inches and tenths).

Monthly snowfall was reported as follows: *Colorado*.—Stamford, 9; Climax, 6.5; Carson, 1.5; Breckenridge, 1; Como (near), Fort Lewis, and Red Cliff, trace. *Nevada*.—Palmetto, 6; Austin, 4; Belmont, Eureka, and Pioche, trace. *Oregon*.—Silver Lake, trace. *Utah*.—Mount Carmel, 2; Losee, trace.

## WINDS.

The prevailing winds during June, 1891, are shown on Chart II by arrows flying with the wind. In New England, over the southern and northern plateau regions, and along the middle Pacific coast, the winds are generally from southwest to northwest; along the immediate south Atlantic coast, from south to southwest; along the east and south Florida coasts, in the west Gulf states, the Rio Grande and Missouri valleys, and on the middle and southeast slopes of the Rocky Mountains, from southeast to south; in the east Gulf states and upper Mississippi valley, from east to south; in the upper lake region, from north to east; on the north Pacific coast, from south to west; on the south Pacific coast, from west to northwest; at Tampa, Fla., from the northeast; and in the middle Atlantic states, the interior of the south Atlantic states, the Ohio Valley and Tennessee, the lower lake region, the extreme northwest, on the northeast slope of the Rocky Mountains, and over the middle plateau region, variable.

## HIGH WINDS.

[In miles per hour.]

Wind velocities of 50 miles, or more, per hour were reported at regular stations of the Signal Service, as follows: 2d, 60, se., at Lexington, Ky. 3d, 59, w., at Saint Louis, Mo. 4th, 60, s., at Fort Canby, Wash. 8th, 50 se., at Fort Sully, S. Dak. 9th, 56, se., at Huron, S. Dak. 13th, 56, se., at Huron, S. Dak. 14th, 54, ne., at Bismarck, N. Dak. 17th, 54, s., at Fort Canby, Wash. 18th, 54, w., at Fort Du Chesne, Utah. 21st, 84, w., at Cairo, Ill.; 50, w., at Winnemucca, Nev. 26th, 52, se., at Sioux City, Iowa. 29th, 60, sw., at Lexington, Ky.

## LOCAL STORMS.

**1st.**—A severe thunder-storm, with rain and hail, passed east over Winnebago county, Ill., in a path about 4 miles in width, at 5 p. m.; wind damaged buildings to the extent of about \$5,000, and crops and trees were injured by hail. Heavy thunder-storms occurred in other parts of Illinois on this date. A severe thunder-storm, with high wind, visited Cincinnati, Ohio, and Covington, Ky., in the afternoon. In Covington lightning struck in several places, and a dynamo belonging to the Cincinnati Electric Light Company was reported fused and practically destroyed. Several houses were unroofed by high wind at Shelbyville, Ky. At Sioux City, Iowa, a violent

thunder and rain storm at night caused some damage. At Alta, Iowa, a horse was killed by lightning. A thunder-storm, with heavy rain and light hail, moved e. by ne. over Fairmount, Kans., in the afternoon, flooding houses and washing out railroad tracks. Heavy rain, hail, and thunder-storms in South Dakota washed out railroads and caused other damage. A heavy wind, rain, and hail storm was reported at Darlington, Wis., in the evening.

**2d.**—At Williamstown, Mass., a church was struck by lightning. A heavy storm of wind, rain, and hail caused damage in the Mohawk Valley, N. Y. A wind storm wrecked four houses and caused other damage at Mount Carmel, Pa., in the evening. Severe local storms occurred in northern Ohio, and high wind prevailed throughout the state. A thunder-storm, with high wind, caused some damage at Louisville, Ky. Heavy thunder-storms visited southern Indiana in the afternoon and evening. Severe storms also occurred in the upper Mississippi valley, and from the west part of the Lake region over the Dakotas. At Cadiz, Wis., a thunder-storm, with high wind and hail, moved northeast in the evening, blowing down timber and killing stock. At Duluth, Minn., a schooner was wrecked and the captain was drowned; schooner valued at \$4,500, and cargo at \$5,000. At Watertown, S. Dak., a storm, with light thunder and hail, moved east of north from 3 to 4 p. m., central time, causing some damage to frail buildings. At Hazel, S. Dak., a hail storm, with some thunder and lightning, moved northeast in a path about one-half mile in width at 2.30 p. m., central time; three persons were killed and sixteen buildings destroyed. A heavy thunder and hail storm occurred at Oklahoma City, Okla. T., in the afternoon and evening.

**3d.**—Severe storms occurred from North Carolina and the middle Atlantic states over the Ohio Valley and the upper lake region. A heavy wind and hail storm caused damage to buildings, etc., near Soapstone Mount, N. C. A thunder-storm, with high wind, passed over Wadeville, N. C.; forest and fruit trees were blown down. Considerable damage was caused by a thunder and wind storm at Lynchburgh, Va. At Ox Bow, W. Va., trees were blown down and crops destroyed by a thunder, rain, hail, and wind storm in the afternoon. Damage was also caused to buildings, timber, and

stock at Tyler Creek, W. Va. A thunder-storm moved east over Pittsburg, Pa., in the afternoon, unroofing a number of buildings and prostrating trees. During a dense fog the night of the 3d-4th three vessels went ashore near Erie, Pa. At 5.30 p. m., 75th meridian time, a heavy hail storm moved northeast over the suburbs of Cincinnati, Ohio, some of the hail-stones being as large as hickory nuts; others were flat and about the size of a silver quarter of a dollar; the width of the path was about one-fourth mile, and its length 2 to 3 miles; the hail was reported the heaviest ever known in the vicinity of College Hill and Mount Healthy, where several barns were unroofed by wind. A hail storm, with thunder and lightning, moved southeast over New Philadelphia, Ohio, in the afternoon. In the evening, during a heavy thunder-storm, a church was struck by lightning, and streets were flooded at Salem, Ohio. A heavy rain, hail, and thunder-storm moved east over Clyde, Ohio, in the morning, causing about \$5,000 damage, mostly to glass and roofs. At Sandusky, Ohio, several buildings were struck by lightning, and large hail fell across the bay. During a thunder-storm in the afternoon a man was killed by a falling tree at Cavett, Ohio. A church was reported wrecked and several houses were unroofed at Salina, Ohio. Damage to trees and buildings was also reported at Xenia, Portsmouth, and other points in Ohio. Heavy local storms occurred in Indiana. At La Porte, Ind., a storm of thunder, rain, and hail about 6 p. m. damaged buildings to the extent of \$5,000 to \$8,000. Heavy storms occurred throughout northern Kentucky. During a thunder-storm at Covington, Ky., in the afternoon, the walls of a railroad machine shop were blown down, killing one person, and causing damage to the extent of about \$3,500. At Augusta, Ky., a thunder, rain, and hail storm in the afternoon caused \$5,000 to \$10,000 damage to buildings. Local storms occurred in Illinois and eastern Missouri. At Saint Louis, Mo., the wind reached 59 miles per hour for 10 minutes at 9.55 p. m. Local storms and hard gales prevailed over the upper lake region. Excessive rainfall caused damage at Milwaukee, Wis. Several vessels were wrecked on Lake Michigan. The storm was very severe over the west part of Lake Superior.

**4th.**—A wind storm caused damage at Benson, N. C., and destructive wind and hail storms visited Robeson and Columbus counties, N. C., in the afternoon. A thunder-storm, with excessive rainfall, moved southeast over Baltimore, Md., from 5.15 to 7.35 p. m. The wind veered from se. at 5 p. m. to nw. at 5.15 p. m., and to ne. at 5.25 p. m., when a velocity of 40 miles per hour, and an extreme velocity of 50 miles, was reached; the gale lasted 15 minutes, and at 8 p. m. the wind was e.; considerable damage was caused by wind and water. Two steamers were driven ashore during a gale near Erie, Pa. A thunder-storm moved east over Albion, Ill., at 5 p. m., killing one person, injuring another, and damaging buildings and crops to the value of several thousand dollars. A thunder-storm moved southeast over Newton, Ill., at 2.30 p. m., causing some damage to buildings. Severe local storms occurred in southern Indiana. At Woodlawn, Ky., a barn was struck by lightning and several valuable horses were reported killed. Storms did much damage at various points in western Missouri. During a heavy rain storm at Chillicothe, Tex., in the evening, out-buildings were washed away and four men were reported drowned.

**5th.**—A violent wind storm visited Christian Co., Ky., in the evening, doing great damage to property near Newstead. At Lebanon, Mo., a hail storm was destructive in a path about one-half mile in width and five miles in length. A horse was killed by lightning near Ansley, Nebr. A severe thunder-storm occurred at Guthrie, Okla. T. Destructive cloud-bursts were reported in north-central Texas and south-west Indian Territory.

**6th.**—A severe thunder-storm passed over Worth Co., Ga., between 5 and 6 p. m., and hail fell in a narrow strip, doing damage to crops, etc. A hail storm damaged corn and cotton at Florence, S. C. A heavy thunder-storm was reported at

Birmingham, Ala. Severe storms occurred in Worth and Jackson counties, W. Va.; in Jackson county two boys were reported killed by lightning. A severe thunder, wind, and rain storm occurred at Cairo, Ill., in the evening. A heavy hail and thunder-storm moved southeast over Olney, Ill., about 6 p. m., in a path about one-half mile in width, causing considerable damage. A storm of heavy rain and light hail occurred at Racine, Wis., in the afternoon. A storm, with funnel-shaped cloud, was reported in Henry Co., Mo. A thunder and wind storm caused damage at Conway, Ark.

**7th.**—A water-spout was observed 5 miles se. from Southport, N. C., at 6.30 a. m.; the column moved east, and about 5 minutes after it was first observed seemed to contract and draw up to the cloud above. A very destructive hail storm was reported in Pittsylvania Co., Pa., in the afternoon. During a heavy rain and thunder-storm at Nashville, Tenn., 200 telephone wires were burned out by lightning. A rain and hail storm caused damage to crops in the northwest part of Tipton Co., Tenn. A water-spout was observed in the Gulf southeast of Galveston, Tex., about 5 a. m., moving nw.; it was apparently about 50 yards in diameter and carried up a heavy spray of water which fell back into the Gulf in torrents. A sudden rise in the Colorado River, Texas, submerged cotton fields and caused other damage; the river is said to have risen 5 feet in 5 minutes, and 12 feet in 3 hours at Austin, Tex. Thunder, rain, and hail storms caused considerable damage in South Dakota. A well-defined funnel-shaped cloud was observed northeast of Rapid City, S. Dak., at 8.15 p. m., 75th meridian time.

**8th.**—A severe thunder-storm visited Wilmington, N. C., in the early morning; switch boards in the telegraph and telephone offices were burned out, and two houses were struck by lightning. Lightning struck several buildings at Okolona, Miss. At Rutherford, Tenn., a man was killed by lightning.

**9th.**—A hail storm caused considerable damage near Davis, La.

**10th.**—A heavy wind and rain storm was reported at Black Rock, Ark., at night. A storm damaged buildings and crops in the north part of Cooper Co., Mo., in the evening.

**11th.**—Heavy thunder-storms occurred in the lower lake region and Saint Lawrence Valley. A man was reported killed by lightning near Hopkinsville, Ky. A cloud-burst occurred in Laclede Co., Mo., at night, submerging farms and destroying crops. During a thunder-storm at Athens, Ga., a house was struck by lightning and two persons were seriously injured.

**12th.**—A number of buildings were struck by lightning and burned in Maine. Severe thunder-storms occurred along the New Jersey coast in the afternoon; at Hammonton, N. J., 3 persons were killed by lightning; the Cape May lighthouse was struck by lightning. At Vicksburg, Miss., a thunder-storm, with heavy rain, occurred in the evening; 2 inches of rainfall were measured for one hour, and damage was caused to crops, etc. A man was reported killed by lightning at Forest Hill, Tex. One person was reported killed and 2 injured by lightning at Little Falls, Minn. Heavy storms occurred in North Dakota, some damage being reported by lightning and wind along the Red River.

**13th.**—A cloud-burst caused great damage in Greene Co., Tenn.; several houses were carried away, crops were destroyed, and stock drowned.

**14th.**—A tornado occurred at Milwaukee, Wis., in the afternoon. The storm-cloud was first observed from the Soldiers' Home at 3.51 p. m., 75th meridian time, moving rapidly northeast. It appeared as a seething, writhing mass, revolving from right to left, and the extreme front was snowy white. It was apparently several hundred feet above the earth, and was attended by an incessant display of lightning, heavy rain, and hail varying in size from a pea to a hickory nut. The lightning was very vivid, appearing like huge tongues of fire. The path of the storm changed to north and then to northwest. The force of the storm was spent about one-half mile north of

the city limits; the path of greatest destruction being most marked outside of the city limits, where it was about 300 yards in width. The storm moved from the Soldiers' Home to where its destructiveness ceased, a distance of about 3 miles, in about 10 minutes. When the downpour of rain and hail had lessened in some degree the storm-cloud presented a baggy appearance, and its action indicated that a funnel or dangling spout was lowered at the corner of 29th and Cedar streets, where a house on the east side of the track was partially overturned and left leaning against a large tree, the upper part of which was carried away. At the corner of 36th and Chestnut streets a house was carried some 50 feet. Other buildings were injured and many trees uprooted, the debris being thrown in confusion in the centre of the track. The estimated damage was placed at \$4,000. The temperature had been high during the day, reaching 84° at the Milwaukee Signal Office in the afternoon. No marked fall in temperature attended the advance of the storm-cloud, and at the Signal Office, three miles to the eastward of the storm, the thermograph shows a decided rise in temperature. The barograph registered a slight rise about 3 p. m., 75th meridian time, but no change about 4 p. m. A thunder-storm prevailed over the city during the passage of the tornado, excepting along the lake front, where the amount of rainfall was inappreciable; at the Signal Office but 0.12 inch of rain fell, but the rainfall was heavier just west of the city limits; and the fall of rain and hail in the few minutes occupied by the passage of the storm-cloud was estimated at 1.00 inch. Heavy thunder-storms occurred in eastern Illinois. During a thunder-storm at North Platte, Nebr., hail about one inch in diameter fell for 5 minutes. Heavy rain, hail, and thunder-storms occurred in the Dakotas; at Bismarck, N. Dak., the wind reached 54 miles per hour at 1.18 a. m., 75th meridian time.

**15th.**—A violent thunder-storm moved east over Vevay, Ind., in the morning; a large barn was struck by lightning and burned. A severe storm was reported in the southern part of Beaver Co., Okla. T., in the evening.

**16th.**—Heavy thunder and rain storms occurred in Frederick Co., Md., in the afternoon. At Bayonne, Hudson Co., N. J., a heavy storm occurred in the afternoon; houses were unroofed, trees blown down, and one building was struck by lightning and burned. There was also some destruction of sailing vessels on the Kill von Kull. The storm is reported as having exhibited some of the characteristics of a tornado, as shown by the position of uprooted trees. Severe storms occurred in Wayne, Berks, York, and Cumberland counties, Pa. At Dyberry trees and buildings were struck by lightning and two barns were burned; one person was killed and others were stunned by lightning; and hail damaged plants. At Boyd's Mills a number of buildings were destroyed by wind, others were struck by lightning and burned, and one man was killed by lightning. Casualties from lightning were reported in the other counties named. Onondaga and Oswego counties, N. Y., were visited by heavy thunder-storms. An unusually severe thunder-storm was reported in Berkeley Co., W. Va., at night. One of the heaviest thunder-storms of the season occurred at Cairo, Ill., in the afternoon; a house was struck by lightning. A man was killed by lightning near Alliance, and a child near North Royalton, Ohio. During a thunder-storm at Saint Louis, Mo., a tree in Forest Park was struck by lightning, and one person was killed and four rendered unconscious. Heavy thunder-storms occurred in Mississippi, causing some damage to buildings, crops, and trees. Severe thunder and rain storms caused damage in the lower Missouri valley, and a destructive hail and thunder-storm occurred near Berlin, Tex. In Ida Co., Iowa, a cloud-burst caused great damage to property in the bottom lands.

**17th.**—Heavy rain and thunder-storms occurred in east Maryland, New Jersey, southeast New York, east Pennsylvania, and Connecticut, where buildings were struck by lightning and crops injured by hail. At Narrowsburgh, N. Y., a man was killed by lightning. At Douglasville, Pa., a funnel-

shaped cloud of a light color was reported, which moved east with a whirling motion, damaging buildings, etc., to the extent of about \$1,000. At Farmington, Ill., a cloud-burst caused swollen streams, and 3 children were drowned. A very heavy rain storm was reported in the valley of the Illinois River. During a thunder-storm at Chattanooga, Tenn., in the afternoon, 1.67 inch of rain fell in 53 minutes; this was reported the heaviest rainfall on record at that station for the period, and much damage was caused by flooding of streets and houses. Heavy rain caused damage by flood in parts of Iowa and Nebraska.

**18th.**—A severe storm was reported in Aroostook county, Me. A destructive cloud-burst occurred at Leechburgh, Armstrong county, Pa. Several buildings were struck by lightning and live stock killed near Garrettsville, Ohio. Heavy thunder and rain storms occurred in Illinois and Indiana, and great damage was caused by swollen streams.

**19th.**—Severe local storms were reported the night of the 19-20th in Kentucky, resulting in considerable damage to property and some loss of life. Monroe and Metcalfe counties suffered severely, and the storm was very destructive in Washington county. The storm was also severe in central Illinois and in parts of Ohio. At 9 p. m., local time, a storm moved northeast near Sylvania, Mo., in a path about one-fourth mile in width, with heavy rain, thunder, and lightning; five houses were destroyed, and much damage was done to orchards. Destructive storms occurred in northern Arkansas. At Fort Smith, Ark., large hail fell, damaging crops, etc. The area of heavy rainfall extended over Kansas and Nebraska. At Arkansas City, Kans., a storm moved east at 3.30 p. m., with light rain and exceptionally large hail-stones, which fell sparingly over a space about two miles square. The width of path of greatest destruction was about 300 yards. There seemed to be three distinct, small storms two to four miles south of Arkansas City. But little damage was done, except by hail. Three children were reported drowned by the washing away of a school-house at Norfolk, Nebr.

**21st.**—Heavy thunder-storms caused some damage in Maryland and Delaware. A cloud-burst was reported near Phenixville, Pa. At Knoxville, Tenn., a man was killed and a house was struck by lightning. At 4.10 p. m., 75th meridian time, a thunder-storm, with exceptionally heavy rain, thunder, and lightning, moved northeast over Cairo, Ill., causing damage in the city to the extent of about \$5,000, and great destruction was reported in the surrounding country. At Charleston, Mo., a storm moved northeast in a path 300 to 500 yards in width, at 3 p. m., with thunder and lightning and very heavy rainfall; damage in the city about \$7,000. Severe thunder-storms were also reported in Arkansas and Nebraska.

**22d.**—At Wilson, Ga., a man was reported killed by lightning, and 2 persons were reported killed by lightning near Jesup, Ga. A man was reported fatally injured by lightning in Jackson county, W. Va. A severe wind storm destroyed buildings at Oakdale, Cal.

**23d.**—Exceptionally heavy rainfall at Storm Lake, Iowa, washed out bridges, etc. Heavy rainfall at night caused disastrous floods in northwest Iowa. In Cherokee county the rainfall was the heaviest ever known in that section, 12.95 inches falling in 12 hours and 24 minutes at Larrabee. A storm, with funnel-shaped cloud, occurred at Sutherland, O'Brien Co., Iowa, in the evening, the damage by wind and rain being estimated at \$15,000. At Wild Rice, N. Dak., a thunder and hail storm occurred in the evening.

**24th.**—Heavy rain and floods continued in northwest Iowa. At Palmer, Nebr., 4 funnel-shaped clouds (probably "prairie twisters") were observed, with very little rain and some thunder and lightning; heavy rain followed at night, washing out railroad tracks. Near Schuyler, Nebr., 2 buildings were struck by lightning. A destructive cloud-burst was reported in Cherokee Co., N. C. At Marksville, La., a man and a horse were killed by lightning, and damage was caused to farming and other property during a thunder-storm. At

Eastport, Me., some damage was caused by lightning. A wind storm damaged fruit trees at Winters, Cal.

**25th.**—A heavy rain and hail storm passed over the eastern part of Colorado in the afternoon. A heavy hail storm moved from the north suburb of Denver to about Plattville, Weld Co., whence the course was eastward. The storm was most severe in the vicinity of Longmont, one of the finest agricultural districts in the state, where hail-stones of unusual size caused great destruction of grain. Lightning caused some damage but no fatalities were reported. Heavy rains caused washouts, delaying railroad traffic. In the vicinity of Denver the hail-stones were very large, and glass one-fourth inch in thickness was broken.

**26th.**—A heavy thunder-storm occurred at Middletown, Conn.; a factory building was struck by lightning and a number of persons were rendered unconscious. At Mount Carmel, Pa., a storm moved south of east, with light rain, thunder, and lightning, at 2.40 p. m. At Natalie, 3 miles from Mount Carmel, the storm lasted 3 minutes; 6 men were killed by the wrecking of a coal breaker. The breaker was a substantial building, 150 feet in length, and stood 155 feet above its foundation; it was valued at about \$20,000. A thunder-storm, with rain and hail, occurred at New York City in the afternoon. A small storm, somewhat tornadic in character, passed over Troy, N. Y., causing damage to the extent of about \$2,000. Near Omaha, Nebr., heavy rains caused washouts on railroads, swept away bridges, flooded sewers, etc. At Genoa, Nebr., railroad traffic was impeded by water flowing over the tracks. At Galveston, Tex., lightning exploded 3 powder magazines 4 miles west of the city; 1 person was fatally, and 12 persons more or less, injured. The value of the powder destroyed was

estimated at \$17,500; damage was caused in the city by the shock.

**27th.**—At Amana, Iowa, 2 houses were struck by lightning. A heavy wind squall in the afternoon, with heavy rain, thunder, and lightning, caused damage to buildings and trees at Des Moines, Iowa. Thunder-storms caused damage in north Missouri, and thunder-storms, with unusually heavy rain, occurred in North Dakota and Minnesota. At Saint Paul, Minn., a house was struck by lightning, and 3 persons were seriously injured. Near Red Wing, Minn., crops were injured by high wind and heavy rain, and some damage was caused by lightning. Lightning struck several houses, causing slight damage, at La Crosse, Wis.

**28th.**—At Louisville, Ky., a thunder-storm, with high wind, prevailed between noon and 1 p. m., causing damage to trees, chimneys, etc. A storm, with heavy rain, thunder, and lightning, moved northeast over Dillsborough, Ind., at 5 p. m.; a whirling motion from right to left was reported; trees were torn up by the roots, some of the tops pointing east and some west. At Centralia, Ill., a heavy thunder-storm, with hail, moved northwest at 4 p. m., damaging buildings. Heavy hail storms injured crops in Iowa. Near Cresco, Iowa, hail-stones were reported as large as walnuts, and the storm was reported the severest hail storm ever experienced in Howard county. The storm was also very severe in Jasper, Montgomery, and Grundy counties. A heavy hail storm occurred at Dodge City, Kans., in the afternoon, causing some damage to crops.

**29th.**—Hail storms were reported at points in the Ohio, middle Mississippi, and lower Missouri valleys, and in the east Gulf states, causing damage to crops, etc., and heavy rain caused damage in the lower Missouri valley.

## UNLAND NAVIGATION.

Heights of rivers above low-water mark, June, 1891 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River.</i>						
Shreveport, La.	29.9	26, 27	17.6	11	11.4	6.2
<i>Arkansas River.</i>						
Fort Smith, Ark.	22.0	8	20.4	19	8.7	11.7
Little Rock, Ark.	23.0	11	19.8	21	10.7	9.1
<i>Missouri River.</i>						
Fort Buford, N. Dak.	.....	28	16.0	1	11.7	4.3
Sioux City, Iowa	18.7	19	13.3	7	9.6	3.7
Omaha, Nebr.	18.0	29, 30	14.4	8	9.6	4.8
Kansas City, Mo.	21.0	30	22.8	1	13.3	9.5
<i>Mississippi River.</i>						
Saint Paul, Minn.	14.0	1	2.9	14, 15, 26	2.5	0.4
La Crosse, Wis.	13.0	24-26, 30	4.6	13, 14, 15	3.7	0.9
Dubuque, Iowa	16.0	3, 30	4.9	16, 17	3.5	1.4
Davenport, Iowa	15.0	6, 7	3.4	16, 17	2.3	1.1
Keokuk, Iowa	14.0	9	4.3	17	2.5	1.8
Saint Louis, Mo.	30.0	25	23.0	3	13.9	9.1
Cairo, Ill.	40.0	14, 15	26.3	5	14.2	12.1
Memphis, Tenn.	33.0	17	20.3	7, 8	11.2	9.1
Vicksburg, Miss.	41.0	21, 22	29.3	2, 3	17.5	11.8
New Orleans, La.	13.0	25	9.0	13, 14, 15	6.7	2.3
<i>Ohio River.</i>						
Pittsburg, Pa.	22.0	8	11.9	30	2.9	9.0
Parkersburg, W. Va.	38.0	24	16.0	20	5.7	10.3
Cincinnati, Ohio	45.0	11	24.5	1	13.7	10.8
Louisville, Ky.	24.0	12	10.1	1	5.6	4.5
<i>Cumberland River.</i>						
Nashville, Tenn.	40.0	26	13.1	3, 4, 5	2.2	10.9
<i>Tennessee River.</i>						
Chattanooga, Tenn.	33.0	26	7.6	7	3.9	3.7
Knoxville, Tenn.	29.0	22	3.9	30	1.5	2.4
<i>Monongahela River.</i>						
Pittsburg, Pa.	29.0	8	11.9	30	2.9	9.0
<i>Savannah River.</i>						
Augusta, Ga.	32.0	13	12.4	30	6.8	5.6
<i>Willamette River.</i>						
Portland, Oregon	15.0	7	14.1	30	12.2	1.9
<i>Susquehanna River.</i>						
Harrisburg, Pa.	17.0	24	6.2	1, 3, 4, 5, 6	2.0	4.2
<i>Alabama River.</i>						
Montgomery, Ala.	48.0	12	8.5	30	2.7	5.8

## FLOODS.

Destructive floods in the smaller streams of the central valleys are not uncommon in June.

On the 5th heavy rains had raised the Pease River, Tex., three feet above the previous high-water mark, submerging railroad tracks and damaging crops. On the 5th the smaller rivers and streams in south-central Missouri were higher than for several years. In southeast Kansas, and Indian and Oklahoma Territories, streams overflowed their banks, causing damage to railroad and farm property. High water in the Colorado and Red rivers submerged fields in Texas on the 7th and 8th. A report from Denison, Tex., dated the 8th, stated that the Red River was higher than at any time since 1867, and that communication with Indian Territory was cut off by the flooding of railroad tracks, and reports from other points along the Red River show that several persons were drowned and that great damage was caused to corn, cotton, and small grain.

On the 18th much damage was caused to farm and other property in central Illinois by the overflow of streams. At Concordia, Kans., the Republican River rose rapidly and a large tract of cultivated bottom land was flooded. On the 19th the Saint Vrain's River, Colo., overflowed its banks, doing much damage to growing crops. The Shenandoah River overflowed its banks in Shenandoah Co., Va., inundating farming lands. A rapid rise was reported in the Missouri River at Kansas City, Mo., on the 21st. On the 22d the Missouri River was 0.8 foot below the danger-line at Kansas City, and considerable damage by overflow was reported along the Missouri and Kansas rivers.

From the 23d to 28th destructive floods along the Little Sioux River, resulting from excessively heavy rainfall, occurred in northwest Iowa, the loss being greatest in Cherokee county, where more than fifty houses were swept away and as many more flooded, and a number of railroad bridges were carried away. Great damage was also caused in counties south of Cherokee, but no estimate of the damage can be made. In South Dakota the Vermillion River was out of its banks, flooding large tracts of cultivated land, and high water in streams